After Sales Technical Documentation

THA–4S
TESLA SERVICE
SOFTWARE USER GUIDE.

TESLA VERSION 01.00

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TESLA SERVICE SOFTWARE USER GUIDE

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General

TESLA Service Software is specially designed to facilitate the servicing of THA–4S Series NAMPS handportable cellular phones. It is also compatible with the THA–4 Series AMPS handportable cellular phones. With a THA–4 Series phone connected some sub–menu's, such as Tuning / RXVCO Tuning, will be inaccessible as they only relate to THA–4S Series phones. Similary, certain sub–menus, such as Tuning / PA Bias, will not be accesible with a THA–4S Series phone connected. All inaccesible sub–menus will be shaded grey on the software user interface.

The software is used to control the phone according to the user's requirements merely by entering commands via the keyboard or mouse of a PC connected to the phone.

This booklet refers to THA–4S TESLA Version 01.00 NMP After Sales will notify service personnel about future upgrades via Technical Bulletins.

IMPORTANT

The technical information contained herein is intended for use by qualified service personnel only.

Required Servicing Equipment

- Computer: IBM PC / AT or compatible with one unused serial port (COM1 or COM2*), one parallel port (LPT1), hard disk recommended.
- Operating System: DOS Version 3.2 or later.
  Operational performance of TESLA cannot be guaranteed under Windows applications.
- 390kB free memory under DOS
- Display: Any 80–character text display
- TESLA program, either LSN–2K (product code 0193718) for 3.5" disk or LSN–2L (product code 0193719) for 5.25" disk.
- Software Protection Key PKD–1 (product code 0750018)
- M2BUS adaptor DAU–2 (product code 0750006)
- Modular Cable XCM–1 (product code 4626131)
- RS 232 Adaptor, 9 – 25 pins (product code 4626170)
- Service Interface Box JTS–1 (product code 0770018)

NOTE: A number of previous generation PCs use the Intel, National Semiconductor or United Microelectronics IC 8250 as the serial port UART. This is a comparatively inefficient circuit for current purposes and does not necessarily support the M2BUS adaptor at 9600 baud. The newer UART's, NS 16450 and NS 16550AF,from National Semiconductors are devices more suited to this application.

Mechanical Connections

CAUTIONS: **Ensure that you have switched off the PC and the printer before making connections.**

Do not connect PKD–1 to the serial port. This could damage the PKD–1.

The software controls the phone via a separate adaptor connected to the serial port of the PC and to the phone's M2BUS (DAU–2 and XCM–1).

Attach the protection key PKD–1 to parallel port one (25–pin female D–connector) of the PC. When connecting PKD–1 to the parallel port ensure that you insert the PC end of PKD–1 to the PC (male side). If you use a printer on parallel port one, insert PKD–1 between the PC and the printer cable.

Using PKD–1 should not adversely affect the operation of other items of test equipment. If errors do occur try printing without the PKD–1 connected. If printing is now ok please contact your dealer.

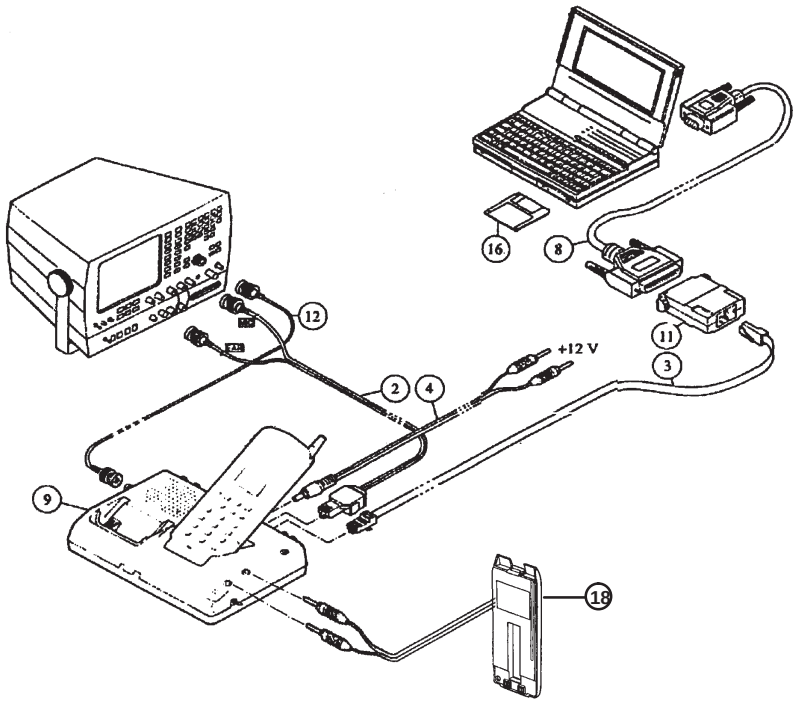
Attach one end of the modular cable, XCM–1, to the PC/M2BUS adaptor, DAU–2, and the other end to the service box, JTS–1. For servicing the phone with the covers in place the service box should always be used. When the covers are removed for servicing the Service Cable, SCC–5, should be connected between JTS–1 and the accessory connector of the system module.

The RF cable should be connected between the RF connector of the test set and the appropriate connector on JTS–1. When the phone covers are removed the RF connection on the extension cable should be used instead.

For audio measurements connect the audio cable, ADS–1, as follows:

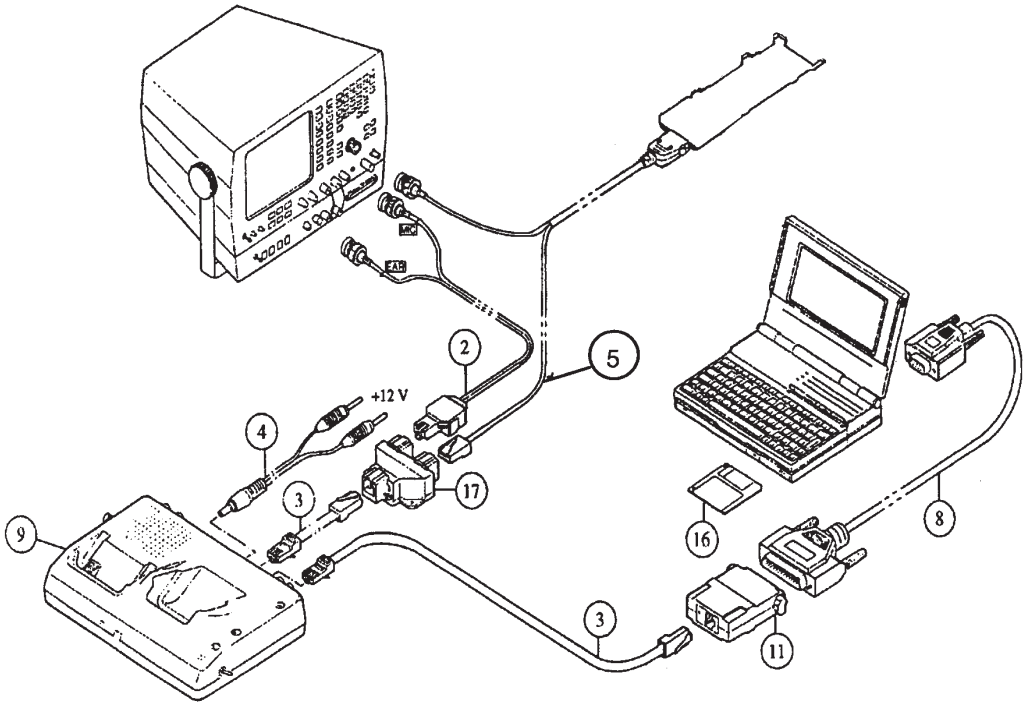
- –EAR line to AF INPUT of test equipment
- –MIC line to MOD GEN OUTPUT of test equipment

Equipment Setup for Testing a Phone with the Covers On



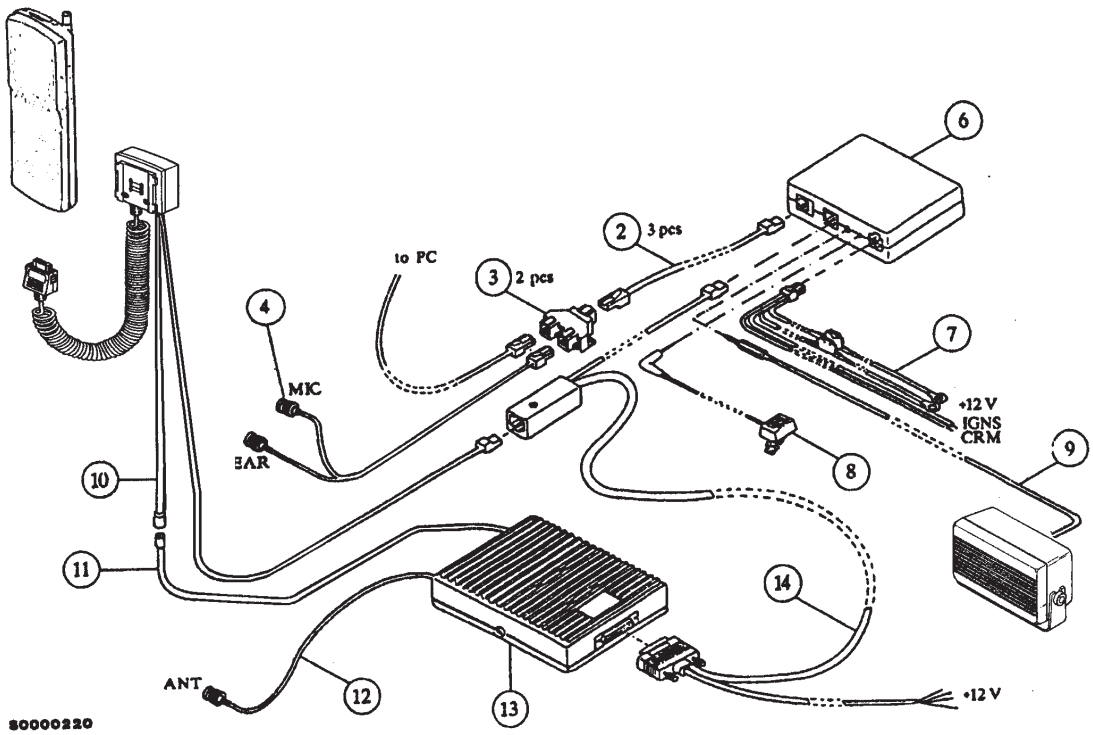
ITEM	ACCESSORY	PRODUCT CODE
2	Audio Cable ADS–1	0730011
3	Modular Cable XCM–1	4626131
4	Power Cable PCS–1	0730012
8	RS232 Adaptor (9–25 pin)	4626170
9	Service Box JTS–1	0770018
11	PC / M2BUS Adaptor DAU–2	0750006
12	BNC–BNC RF Cable	NOT SUPPLIED
16	Service Software LSN–2K	0193718
18	Dummy Battery BTS–6	0770020

Equipment Setup for Testing a Phone with the Covers Off



ITEM	ACCESSORY	PRODUCT CODE
2	Audio Cable ADS–1	0730011
3	Modular Cable XCM–1	4626131
4	Power Cable PCS–1	0730012
5	Service Cable SCC–5	0770019
8	RS232 Adaptor (9–25 pin)	4626170
9	Service Box JTS–1	0770018
11	PC / M2BUS Adaptor DAU–2	0750006
16	Service Software LSN–2K	0193718
17	Modular T–connector	4626134

Equipment Setup for Booster Tuning



ITEM	ACCESSORY	PRODUCT CODE
2	Modular Cable XCM–1	4626131
3	Modular T–connector	4626134
4	Audio Cable ADS–1	0730011
6	HF Junction Box HFJ–2	0694006
7	Power Cable PCH–4	0730009
8	HF Microphone HFM–3	0690001
9	HF Speaker HFS–6	0692006
10	Cable Junction Box JBH–1	0630008
12	Antenna Cable	9780014
13	Booster BSH–2	0500053
14	Front Mount Cable SCE–2	0730014

Start–up Procedure

From diskette

1.Switch the phone on; press **power–on** button of the handset.

2.Switch on the PC.

3.Insert the TESLA disk into drive A of your PC

4.Log into drive A: *type **A**:*
< Enter >

5.Start TESLA.EXE and run TESLA *type **TESLA***
<Enter >

From hard disk

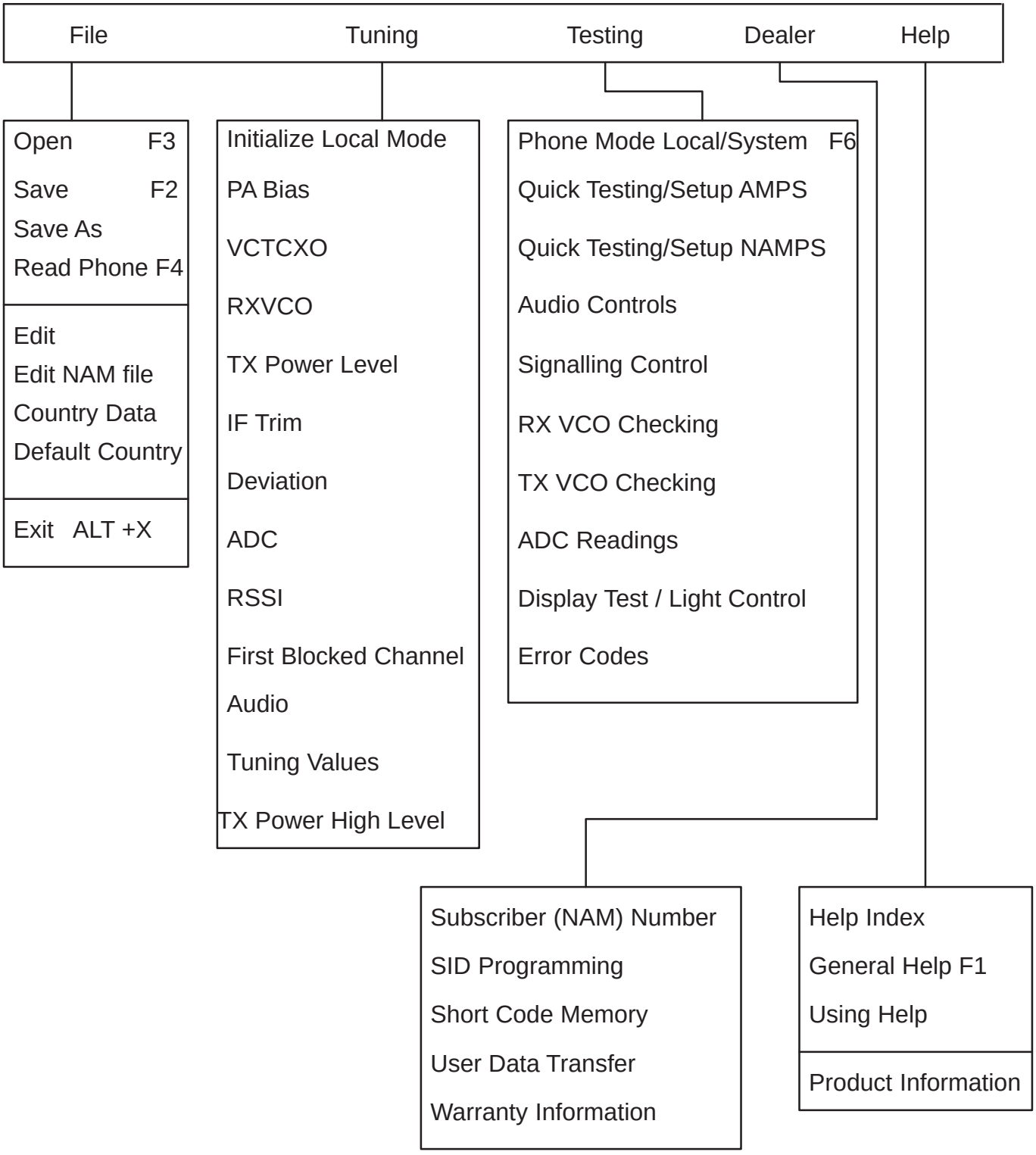
1.Log into drive C: *type **C**:*
< Enter >

2.Start TESLA.EXE and run TESLA *type **TESLA***
< Enter >

The TESLA Service Software starts by loading the configuration file. After the configuration file has been loaded, a menu bar appears on the top line of the display. Refer to section ” Using Menus ” for how to proceed through the menus. A Phone Identification Window, which displays some basic information about the connected phone, appears in the middle of the display.

Press Enter to close the Phone Identification Window.

TESLA Service Software Menu Structure



Using Menus

There are three visible components to TESLA: the menu bar at the top, the window area in the middle and the status line at the bottom of the screen. Many menu items also offer dialogue boxes. Although there are several different ways to make a selection in TESLA, they all access the same commands and dialogue boxes.

The *menu bar* is the primary method of accessing the menu commands. When a command is followed by an ellipsis (...), additional sub–menu(s) are available, otherwise the action occurs as soon as the command is chosen.

To choose menu commands using the keyboard proceed as follows:

- Press F10 to make the menu bar active; the next characters you type will relate to the items on the menu bar.
- Use the ← → arrow keys to select the menu you wish to display and then press Enter. As a shortcut to this step you can just select the highlighted letter of the menu title. For example, when the menu bar is active, press F to move to and display the File menu. At any time press Alt and the highlighted letter (eg *Alt* + F) to display the menu you want.
- Use the ↑ ↓ arrow keys to select command from the menu you have opened and press Enter. As a shortcut you can just press the highlighted letter of the menu command.

At this stage, TESLA either carries out the command, displays a dialogue box or displays another menu.

There are two ways to choose commands using the mouse:

- Click the desired menu title to display the menu and click the desired command.

OR

- Drag from the menu title down to the menu command. Release the mouse button on the command you want. If you change your mind, simply drag off the menu and no command will be chosen.

TESLA offers a number of quick ways to choose menu commands. The click–drag method for mouse users is an example. From the keyboard, you can use a number of keyboard shortcuts (or 'hotkeys') to access the menu bar, choose commands or work with dialogue boxes. You need to hold down Alt while pressing the highlighted letter when moving from input box to a group of buttons or boxes.

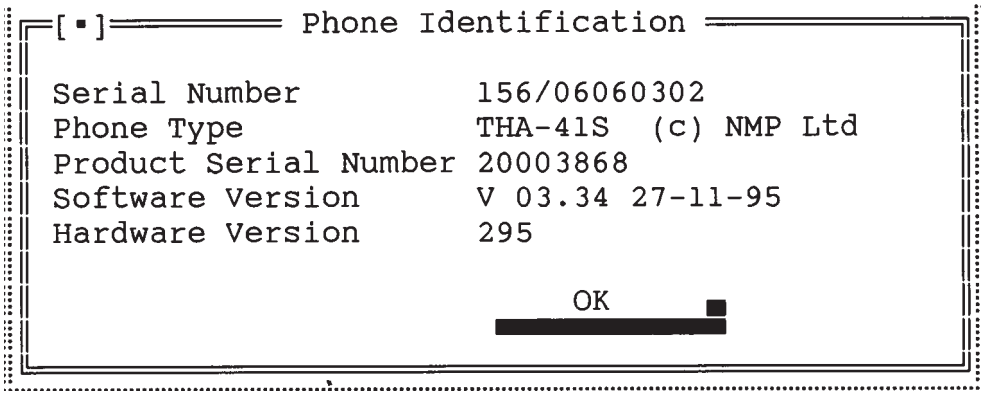
Windows

Some of the actions you see and do in TESLA happens in a window. A window is a screen area that you can open, close and move.

Most of the windows have these things in common:

- a title bar
- a close box
- scroll bars

The following figure shows a typical window:



The close box of a window is the box in the upper left corner. Click this box to quickly close the window.

The title bar, the uppermost horizontal bar of a window, contains the name of the window. You can drag the title bar to move the window around the screen.

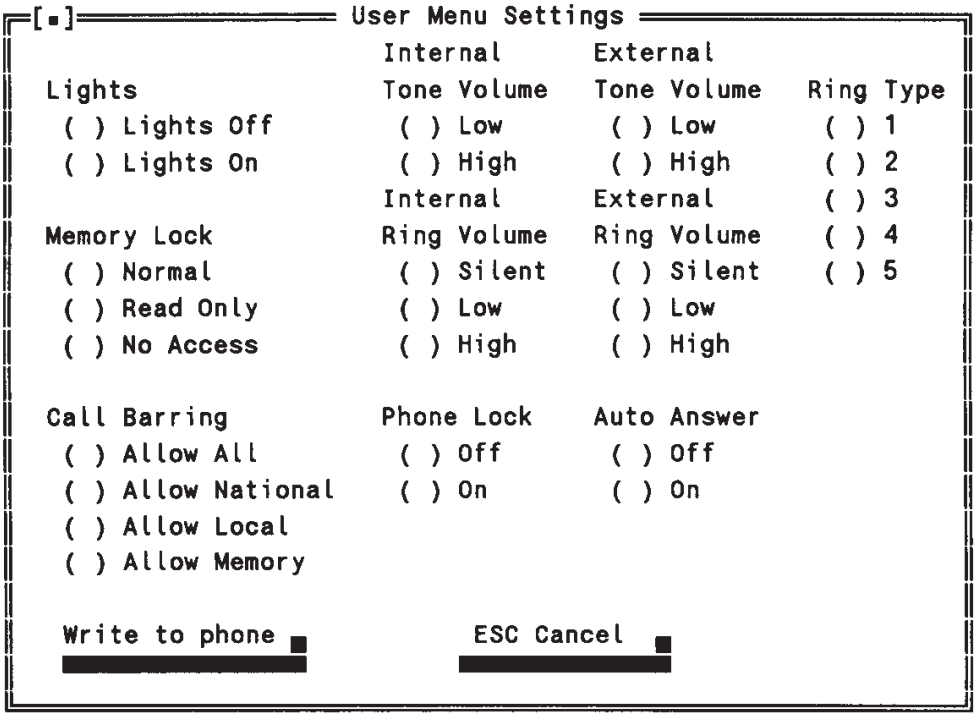
You can use scroll bars with a mouse to scroll the contents of a window. Click the arrow at either end to scroll one line at a time (keep the mouse button pressed to scroll continuously). You can click the shaded area either side of the scroll box to scroll one page at a time. Finally, you can drag the scroll box to any spot on the bar to quickly move to a spot in the window relative to the position of the scroll box. From the keyboard you can scroll the window contents using the arrow keys.

Dialogue Boxes

Most of the menu commands lead to a dialogue box. Dialogue boxes offer a convenient way to view and set multiple options. They are typically used for making settings or performing some action where the phone must be in a certain state and all other actions must be denied. When you are making settings in a dialogue box you work with five basic types of on–screen control:

- action buttons
- radio buttons
- check boxes
- input boxes
- list boxes

Dialogue boxes also have similar features to windows; title bar and close box. Below is a sample box which shows some of these features:



This dialogue box has two standard buttons: Enter and Esc. If you choose Enter, or the associated command (‘Write to phone’ in this case), the choices in the dialogue box are accepted. If you choose Esc, the dialogue box is exited and no parameters are changed. Esc is always a keyboard shortcut to exit the dialogue box.

If you are using a mouse, click the dialogue–box button you want. When you are using the keyboard, press *Alt* and the highlighted letter of an item to activate it. Press Tab to move forwards or backwards from one item to another in a dialogue box. Each element is highlighted when it becomes active.

Radio buttons operate in a similar manner to car–radio buttons. They are arranged in groups, and only one radio button in a group can be selected at any one time. To choose a radio button, click it or its text. From the keyboard, select Alt and the highlighted letter or press Tab until the group is highlighted, and then use the arrow keys to choose a particular radio button. Press Tab again to leave the group with the new radio button chosen.

Check boxes differ from radio buttons in that you can have any number of check boxes selected at any time. When you select a check box an X appears in it to indicate it has been selected. An empty box indicates it is not selected. To change the status of a check box, click it or its text, press Tab until the check box is highlighted and then press the Spacebar or select Alt plus the highlighted letter.

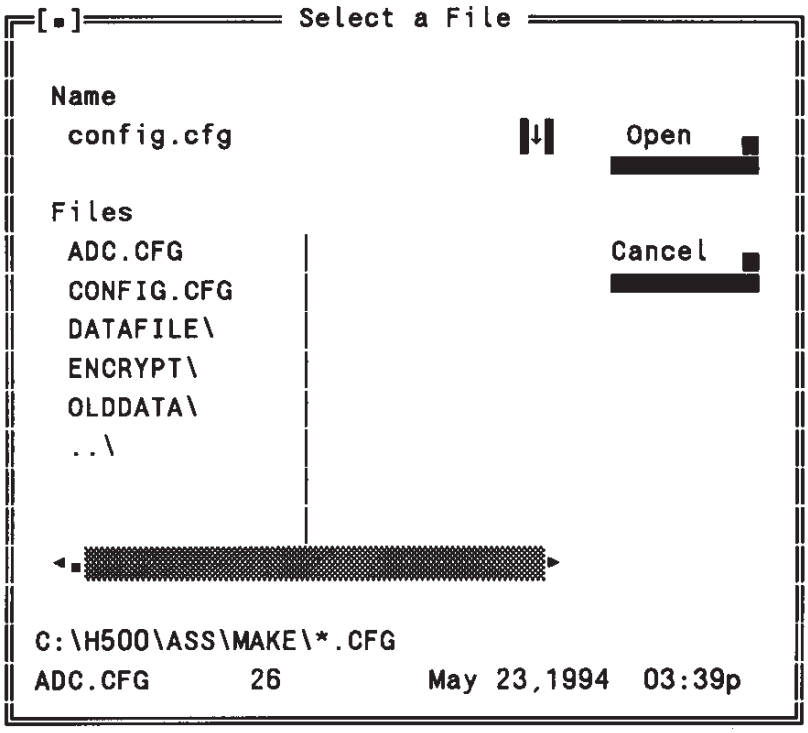
If several boxes apply to a topic, they appear as a group. In this case tabbing moves to the group. Once the group is selected use the arrow keys to select the item you want and then press Spacebar to check or uncheck it.

Input boxes let you type in text. Most basic text–editing keys work in the text box (for example arrow keys, Home, End, Backspace, Del and Ins). If the contents of the input box are highlighted (typically when you first select it) and you start typing in new data, the old data is erased.

A final component of some dialogue boxes is a list box, which lets you scroll through and select from variable length lists without leaving a dialogue box. You make a list box active by clicking it or by choosing the highlighted letter of the list title (or press Tab until it is highlighted). Once a list box is displayed, you can use the scroll box to move through the list or press the ↑ ↓ arrow keys from the keyboard.

File–Selection Dialogue Box

The File–Selection Dialogue box allows you to select and open a file, enabling you to either read data from, or write data to that file. Below is an example of such a box:



Overview

TESLA is divided into 5 main blocks: File, Tuning, Testing, Dealer and Help.

File is used to save all parameters to a configuration file to enable set up as required. It is possible to change the PC settings to a configuration file as well as the default parameters of the phone such as channel number, transmitter on / off, audio settings etc. It is also used to edit default settings for NAM information.

Tuning contains the functions required for tuning the phone.

Testing contains the functions required for testing the phone in Local mode.

Dealer is used to edit all NAM and other user information. It also contains user data transfer programs to be used in case a faulty phone should be replaced with a new unit.

Help contains all the help information for using TESLA.

File Menu

The file menu contains commands related to file operations. It allows you to save and edit configuration files and also exit TESLA.

Open

The File / Open command displays a File–Selection dialogue box that allows you to select a configuration file to open. You can edit these parameters with File / Edit command. Once the file is opened the new values take effect. The shortcut command for this is on Function Key F3.

Save

The File / Save command saves the previously opened configuration file. If no file has been opened, the Save As command is performed instead. The shortcut command for this is on Function Key F2.

Save As

The File / Save As command allows you save the configuration file under a different name, in a different directory or on a different drive. When you choose this command you will see the File–Selection dialogue box for Save File As.

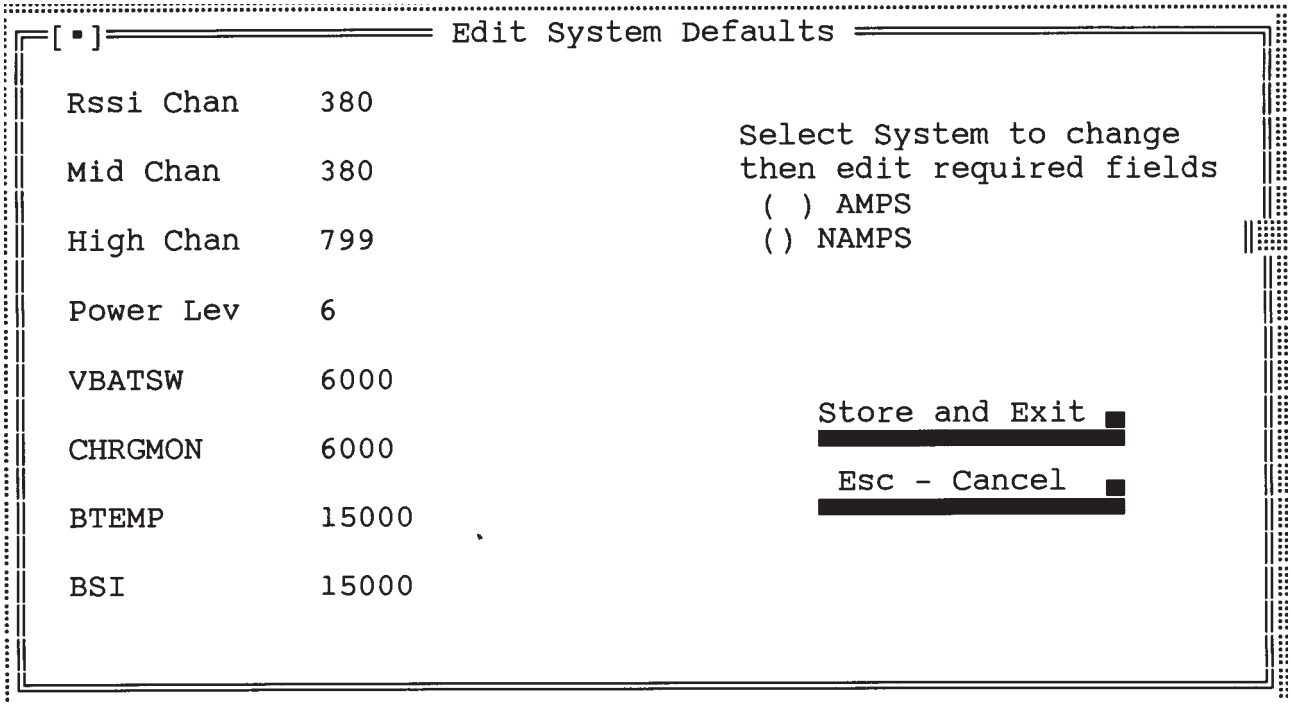
Read Phone

The File / Read Phone command allows you to speed up the process of verifying that a new phone has been connected to TESLA. When selected TESLA will search for a phone and, when found, will display the Product Identification Window. The shortcut command for this is on Function Key F4.

Edit

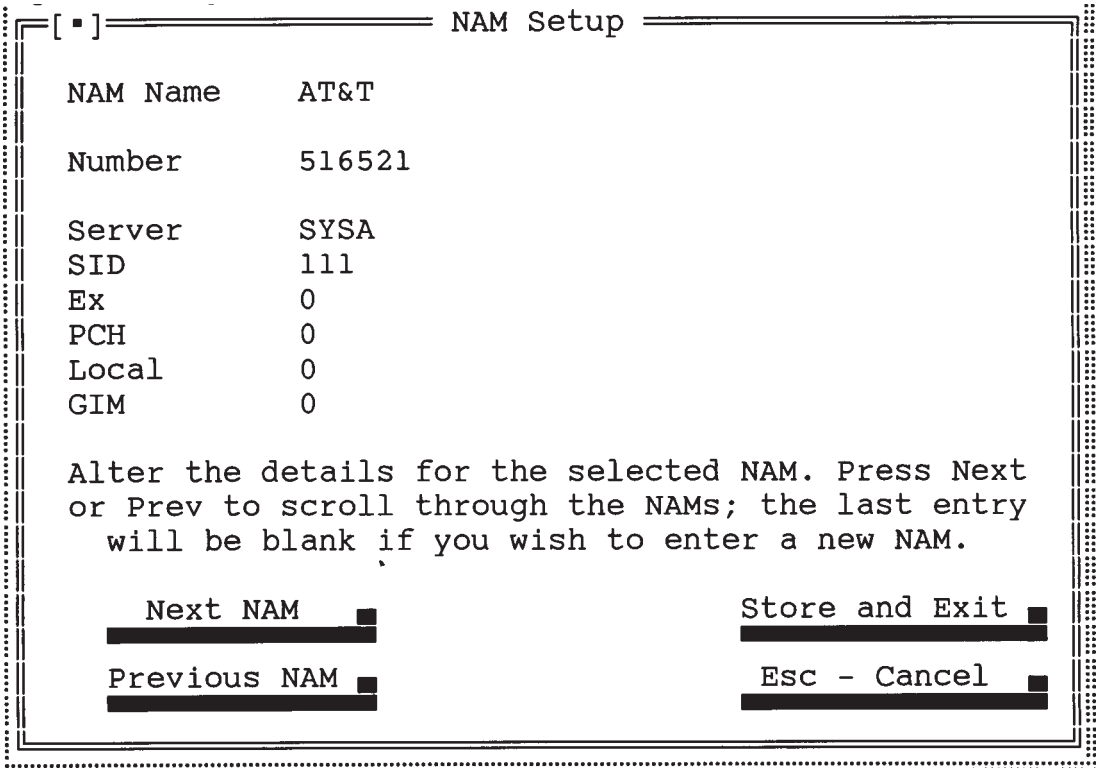
The File / Edit command opens a dialogue box for editing Testing Menu configuration file contents. This window is illustrated over the page:

At the top of the dialogue box you can see the name of the current configuration file. Below that are default testing / Local mode settings. Select the value you want to change using 'hotkeys' (*Alt* + letter), clicking by mouse or using Tab keys and then type in the new value. Accept the changes by pressing 'Store and Exit' or abandon by pressing Esc (or click the corresponding button).


[▪]
Edit System Defaults
Rssi Chan 380
Mid Chan 380
High Chan 799
Power Lev 6
VBATSW 6000
CHRGMON 6000
BTEMP 15000
BSI 15000
Select System to change
then edit required fields
( ) AMPS
() NAMPS
Store and Exit
Esc - Cancel

Edit NAM File

The File / Edit NAM File command open's a Window which allows the editing of default NAM Data to be used when programming the NAM of a phone using the Dealer / Subscriber NAM Number menu. This Window is illustrated below and shows an example of the file that will be delivered with TESLA.


[▪]
NAM Setup
NAM Name AT&T
Number 516521
Server SYSA
SID 111
Ex 0
PCH 0
Local 0
GIM 0
Alter the details for the selected NAM. Press Next or Prev to scroll through the NAMs; the last entry will be blank if you wish to enter a new NAM.
Next NAM
Store and Exit
Previous NAM
Esc - Cancel

TESLA will come delivered with an example of a typical NAM contents for a USA subscriber number. This menu can be added to and updated by any user of TESLA. It is recommended to follow the example shown in the illustration above.

Country Data

The File / Country Data command opens a Window which allows the editing of the Country Data, such as International Dialling Code, National Dialling Code etc which is associated with the Subscriber NAM Number of a phone. This Window is illustrated below

TESLA will come delivered with a Country Data file completed with data for the following countries:

USA

Israel

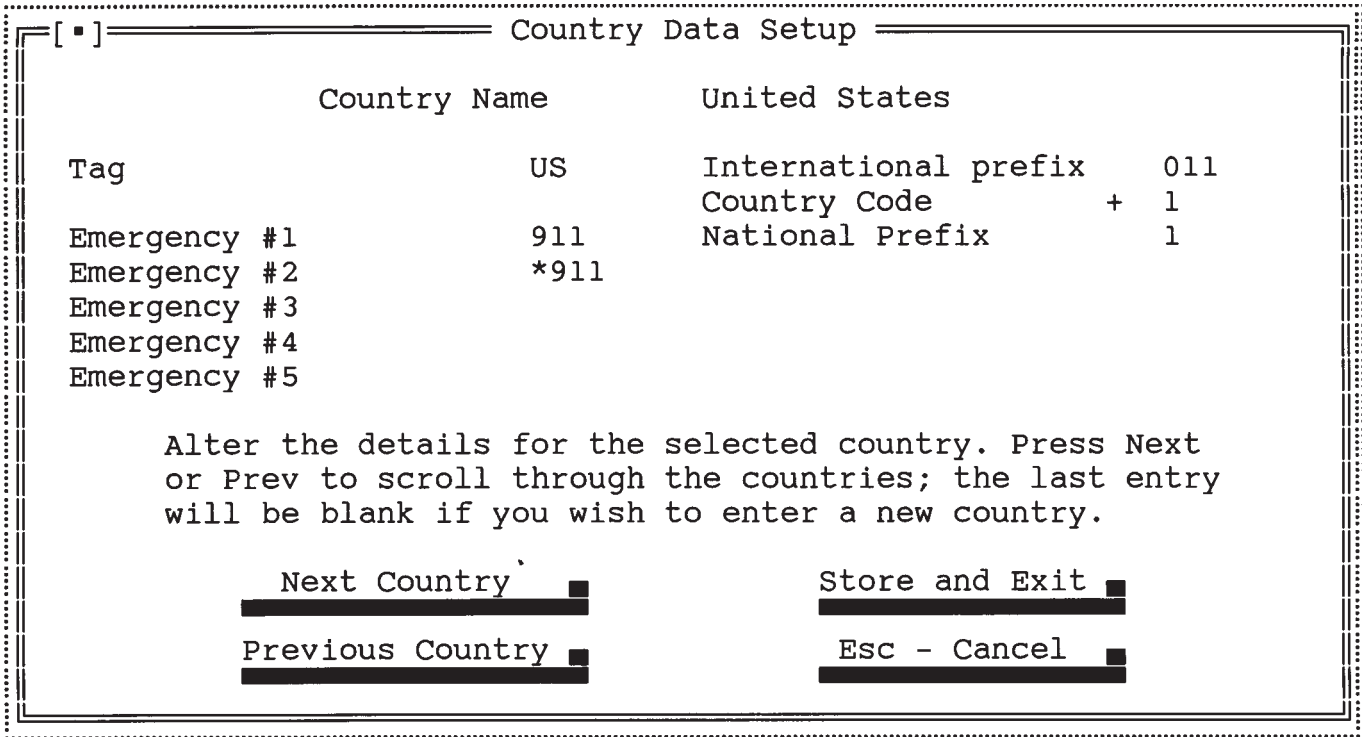
Thailand

Philippines

Venezuala

Argentina

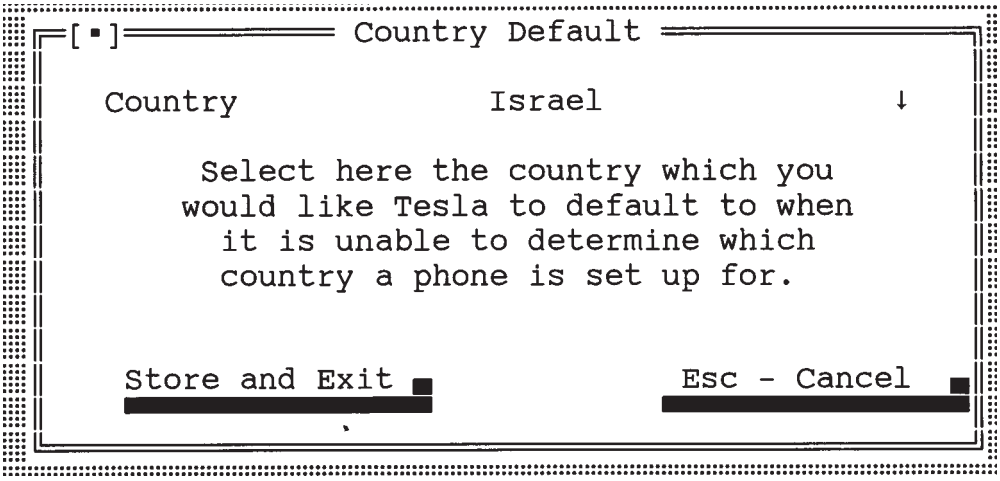
Mexico



The file is user editable and other countries can be added at a later date.

Default Country

The File / Default Country command opens a Window which allows the selection of one of the country data files for use with the Dealer / Subscriber NAM Number menu. This Window is illustrated below.


[▪]
Country Default
Country
Israel
↓
Select here the country which you would like Tesla to default to when it is unable to determine which country a phone is set up for.
Store and Exit
Esc - Cancel

This menu is user selectable.

Exit

The File / Exit command exits TESLA. Before exiting, a confirmation box is displayed. Pressing Enter quits the program and Esc cancels exiting.

Tuning Menu

General

Almost all tuning of the phone is carried out using TESLA software. TESLA switches the phone/system module into Locals mode, in which the phone can be remotely controlled via the M2BUS interface.

Tuning is achieved by the TESLA software communicating with the D/A and A/D convertors of the phone. In some instances, the phone processor will also calculate the required correction parameter.

The calibration data of the phone resides on the EEPROM. The contents of the EEPROM can be read by the TESLA program and saved as a file. This is useful when there is a need to retain this information ie. if you need to replace the EEPROM during the repair process. The program also enables writing of the factory preset calibration data to the EEPROM, after which, the whole tuning process should be repeated.

If a repair has been carried out on the RF section of a system module then the appropriate tunings should be performed as described in the following section using the on–screen help menus as a guide.

CAUTION:

During tuning:

- take care not to damage sensitive measuring instruments when excessive RF power levels are present
- perform all tuning steps in the order described
- never try to mask a fault by tuning it out

Tuning Menu

This menu contains the commands required for tuning the phone. Selecting the Tuning menu opens a sub–menu from where the desired Tuning parameters can be selected. After you select a tuning parameter from the sub–menu, a tuning dialogue box will be opened and all necessary settings for the phone will be done automatically.

PA Bias Alignment

THIS ALIGNMENT IS ONLY NEEDED FOR THA–4 SERIES PHONES.
This command allows you to tune the two stages of the TX power amplifier separately to achieve maximum efficiency.

Tuning Procedure

1.Select Tuning / PA Bias

2.The PA Bias Calibration procedure is as follows:

a) Enter the phone current, as measured on a meter, into the Supply Current Text Box and then select Next Stage.

b) Follow the on–screen menu instructions to set PA Driver Bias Value and select Next Stage. Repeat this process for PA O/P Bias Value.

c) Enter the new value to EEPROM by pressing ENTER on the keyboard or clicking on the corresponding button using the mouse.

VCTCXO Alignment

This command is used to tune the VCTCXO frequency of the phone. This command will tune the phone to channel 380 and activate the transmitter. Use an accurate frequency counter when measuring the resultant output. Please note that the VCTCXO should only be aligned using TESLA. No attempt should be made to physically tune the device using the trimming capacitor.

NOTE :– **The target value for THA–4 Series phones is 14.85MHz whilst for THA–4S Series phones it is 14.4MHz. The on screen information reminds you of the target value.**

Tuning Procedure

1.Select Tuning / VCTCXO Tuning

2.Adjust Tx carrier frequency (F_0) to within +/– 50Hz of the target value

3.Enter the new value to EEPROM by selecting Store and Exit.

RXVCO Alignment

THIS ALIGNMENT IS ONLY NEEDED FOR THA–4S SERIES PHONES. This command allows you to adjust the RX VCO to within the optimum lock range. This is an automatic alignment with no requirement for external test equipment. Once the Automatic Test has been performed the resultant DAC value radio button will be highlighted and Test Result will read OK.

Tuning Procedure

1.Select Tuning / RX VCO

2.Select Automatic Test.

3.Enter the new value to EEPROM by selecting Store and Exit.

TX Power Level Alignment

This command is used to tune the phone's TX power levels. When selected, the transmitter will be switched on at Power Level 0 on Channel 380.

Tuning Procedure

1.Connect a power meter to the phone's external antenna connector

2.Select Tuning / TX Power Level

3.The Channel Number can be changed using Backspace and Return keying commands. After Return, the cursor will return to the last power level selected

4.To tune a Power Level, select the level you wish to tune from the list. The target value will appear to the left of the cursor. Use the Coarse and Fine commands until the target value is reached.

5.Enter the new value to EEPROM using Enter New Value

6.Follow this procedure for all the Power Levels

IF Trim DAC Alignment

THIS ALIGNMENT IS ONLY NEEDED FOR THA–4 SERIES PHONES.
With this command you can check that the RX IF Frequency is tuned to give optimum RSSI. This is an automatic process using an 8–bit DAC.

Tuning Procedure

1.Select Tuning / IF Trim Alignment

2.Set RF input signal to –93dBm on the Channel Number indicated on the PC screen

3.Select Automatic Tuning. The RSSI is measured for each of the 8 DAC levels, with the optimum level indicated when the process is completed.

4.Select Re–read RSSI to check this highest level

5.Enter the new value to EEPROM by pressing Enter on the keyboard or clicking on the corresponding button using the mouse.

Deviation Alignment

A number of deviation tunings are grouped together in this command. They are, however, still tuned independently of each other.

Tuning Procedure

1.Select Tuning / Deviation

2.Select Sig Tone to move cursor and show the relevant on–screen information for that particular tuning parameter

3.Use the Coarse and Fine commands until the target value is reached

4.Repeat for Nominal and Maximum Deviation tunings

5.Enter the new value to EEPROM by selecting Store and Exit.

ADC Alignment

With this tuning, the Battery Reference value and Reference Charge voltage value are both set using an accurate 6V power supply, provided by Service Interface Box JTS–1. These tunings should not be attempted while the phone covers are removed, as the voltage used to power the phone is too inaccurate when not using the Dummy Battery Pack, BTS–6.

Tuning Procedure

1.Select Tuning / ADC Calibration

2.For VBATSW, the program displays the EEPROM value expected and the 6V A / D reading actually present on the VBAT line. It compares the two and the difference is the value stored to EEPROM.

3.For CHRGMON the program reads the EEPROM value expected and the 6V A / D reading actually present on the VC line. It compares the two and the difference is the value stored to EEPROM.

4.Enter the new value to EEPROM by selecting Store and Exit.

RSSI Reference Alignment

A different window is displayed depending on whether a THA–4 or THA–4S series phone is connected. The appropriate window is displayed automatically with no manual selection required from the user.

FOR THA–4 SERIES PHONES this consists of tuning the noise floor reference value for the RSSI meter. This is carried out with no input signal present.

Tuning Procedure

1.Select Tuning / RSSI Reference

2.Disconnect the RX signal from the phone's external antenna connector and press Return

3.The program displays the reference value stored in the phone together with the value read from the A / D convertor. The A / D value can be re–read by pressing the spacebar.

4.Enter the new value to EEPROM by selecting Store and Exit.

FOR THA–4S SERIES PHONES this consists of aligning the RSSI reading at 7 different input signal levels between –75 dBm and –105 dBm. The default channel for this alignment is channel 380. If desired this can be changed using the File / Edit Menu.

Tuning Procedure

1.Select Tuning / RSSI Reference.

2.Set RF input level to –75 dBm at Chnannel 380.

3.Select the Space Bar to measure the RSSI reading.

4.Set RF input level to –80 dBm and repeat Step 3.

5.Complete the above proces for all 7 levels.

6.Enter the new values to EEPROM by selecting Store and Exit.

First Blocked Channel

The harmonic components of the modem crystal can decrease the sensitivity of the receiver on some channels. To prevent this blocking effect, the oscillator frequency is measured so that the frequency can be shifted slightly at those channels which could be blocked.

Tuning Procedure

1.Select Tuning / First Blocked Channel

2.Connect a Frequency Counter to pin 7 of N403 (THA–4 phones) or D100 (THA–4S phones) on the System Module.

3.Write the measured frequency to the Text Editing Box.

4.Enter the new value to EEPROM by selecting Store and Exit.

Audio Settings

This menu allows you to set up the NANTIC registers for the internal and external microphone and loudspeaker signals.

Tuning Values

With this command you can save the Tuning Data from the EEPROM to a file. You can also write either previously saved data or factory default values from a file to a phone's EEPROM. This is useful if the EEPROM device has had to be replaced during the repair procedure.

TX Power High Level

THIS ALIGNMENT IS ONLY NEEDED FOR THA–4S SERIES PHONES. To compensate for the characteristics of the chosen PA module it is necessary to align Power Level 0 at 8 points across the TX band, starting at Channel 19 and finishing at Channel 747. At each of these Channels is an appropriate Power Factor i.e. Power Factor 0 at Channel 19, Power Factor 1 at Channel 123 etc.

NOTE This Power Factor is not the Power Level to be aligned to. The Power Level to be aligned to is always Power Level 0 i.e. target value is always 28dBm at each channel.

1.Connect a power meter to the phone's external antenna connector

2.Select Tuning / TX High Power Level.

3.Select Power Factor 0 from the list. The target value is 28 dBm. Use the Coarse and Fine commands until the target value is reached.

4.Enter the new value to EEPROM using Enter New Value.

5.Follow this procedure for all the Power Factors.

Testing Menu

The Testing Menu allows the Service Technician to switch a phone to Local mode in order to attempt to simulate a reported fault or configure a phone to test a certain parameter. It allows the technician complete control over internal and external audio, and the RF settings.

When Testing is selected, the phone is placed into Service mode automatically. This is known as Local mode. Unless the user changes this configuration, using File, the phone receiver is tuned to Channel 380; the Transmitter synthesiser is also tuned to Channel 380 but with the power amplifier switched off.

Phone Mode – Local / System

This allows you to change from Local Mode to normal System Mode and back to Local Mode. Function Key F6 also operates this feature.

Quick Testing / Setup AMPS

This command opens a Window allowing the user full control over the channel the phone is tuned to; the transmit power state; and access to some simple audio routing and signal switching.

Audio Controls

This command allows you to test all possible audio paths in and out of the audio processing device including XMIC, XEAR and DTMF.

Signalling Control

This command allows the setting of the following signalling parameters. The * symbol in each column indicates the phone's present state.

Supervisory Tone

SAT 0 5970 Hz

SAT 1 6000 Hz

SAT 2 6030 Hz

SAT Off

Sig Tone

ST On

ST Off

Data Output

Wide Band Data On

Wide Band Data Off

State

Mute

Mic

Ext Mic

DTMF

Quick Testing / Setup NAMPS

THIS MENU IS ONLY ACCESSIBLE WITH THA–4S SERIES PHONES.
In addition to all of the features available in Quick Testing / Setup AMPS this menu also allows the selection of the Narrow Band Channels used in NAMPS.

Audio Testing

This command will allow the checking of the audio signals through the various paths of the NANTIC audio device.

Signalling Control

This command allows full control over the following Signalling parameters of the phone:

Supervisory Tone, Signalling Tone, Data Output, TX Power State and selection of microphone path.

RX VCO Checking

This command will check that the RX VCO synthesiser will lock across the required bandwidth. This is only a check facility; there is no parametrical tuning involved. You can select Scan Band for complete bandwidth analysis or Frequency Sweep for Cellular Bandwidth analysis.

TX VCO Checking

THIS MENU IS ONLY ACCESSIBLE WITH THA–4 SERIES PHONES.
This command will check that the TX VCO synthesiser will lock across the required bandwidth. This is only a check facility; there is no parametrical tuning involved. You can select Scan Band for complete bandwidth analysis or Frequency Sweep for Cellular Bandwidth analysis.

ADC Reading

This displays a table showing the following readings of the A / D convertors.

0	VBATSW	Battery voltage
1	CHRGMON	Charge voltage
2	RSSI	Received Signal Strength
3	TXI	Transmit power monitor
4	BTEMP	Battery temperature
5	HOOK	Hook line
6	BSI	Battery size indication
7	HFCON	Handsfree control

Display Test and Light Control

This enables checking of the operation of the display segments and the phone backlighting.

Display Test

Clear Display

Fill pattern 1 switches on all icons and fills alphanumeric area with a pattern

Fill with pattern 2 switches on all icons and fills alphanumeric area with a different pattern

Fill with pattern 3 switches on all icons and fills alphanumeric area with a different pattern

Lights

On switches on all backlighting

Off switches off all backlighting

Reading Error Codes

This command can give one of the following error codes.

1 Error in EEPROM id field

2 Error in EEPROM RF tuning parameters

3 Error in EEPROM audio tuning parameters

4 Error in EEPROM device / charge tuning parameters

5 Error in checking the serial number

7 Error in the modem circuit

or ’No Error Detected’

Dealer

Selecting Dealer will bring up a sub–menu as shown below:

Subscriber (NAM) number

Short code memory

User menu settings

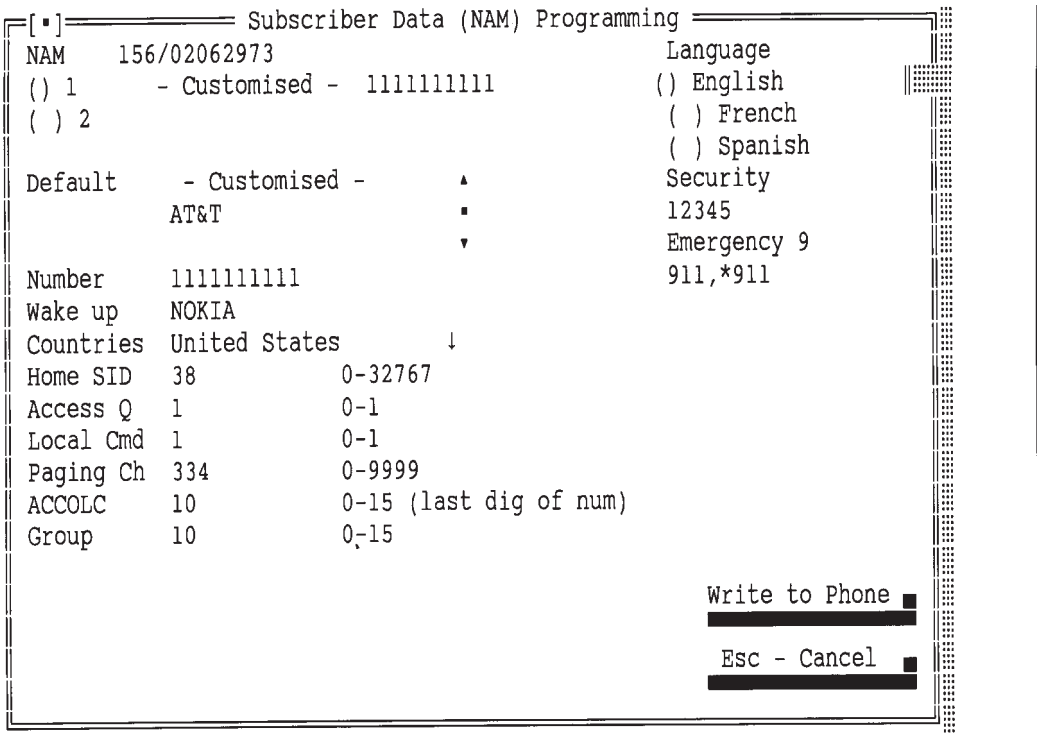
User data transfer

Subscriber (NAM) Number

This can be used to program all the Subscriber Data and Common NAM Data information into a phone. This can also be programmed through the phone's keypad. A customisation feature is also available through File menu. This allows the user to set up common system data / default settings for any cellular operator and then recall them in this menu. It is primarily aimed as a time saving feature for dealers.

CAUTION: If you wish to only view and not change the NAM information, press Esc to exit the screen.

Either NAM in the phone can be read from / written to by selecting either 1or 2. When a selection is made all the NAM information displayed on the PC is updated. Basic information displayed next to 1 and 2 is operator name (if the phone has been programmed using the customisation feature) and Subscriber Number.



In the example Figure above (taken from a THA–4 Series Phone), this is

ESN Displayed 156/02062973

NAM

(*) **1** – Customised – 1111111111

( ) **2**

From this example it can be seen that NAM 1 has been programmed. The ESN of the phone is also clearly displayed.

Dealers are strongly advised to use the customisation feature. For any operator they could store, as the default setting, the following parameters:

- Country – this information should contain the international prefix, country code and national prefix.
- Home SID – this number is used to define the primary traffic area of the phone. The number contains the country code, system bit information and the area code.
- Access Q – this is used to define the method of sending the phone identification data (1 = country code in use; 0 = no country code in use).
- Local Cmd – this is used to determine if Local Mode Mesaages are accepted.
- Paging Ch – this number is used to identify the primary traffic channel of the phone.
- ACCOLC – this number is used to identify which overload class the phone belongs to.
- Group – this is used to determine which group the phone is opearting in.

You are also able to store:

- Language –With THA–4 Series Phones 3 languages can be selected (English, French or Spanish). With THA–4S Series Phones 2 languages can be selected (English or Spanish).
- Emergency 9 – 3 different emergency numbers can be defined. The principal emergency number programmed should be the emergency number applicable to the user's primary location.

The process for programming a NAM with this method is as follows:

1.Select NAM 1 or 2.

2.Select Default – scroll through the available defaults using the arrow keys until you find the desired default. All the default information will be displayed on the PC screen

3.Select Number and program the new subscriber number using the normal text editing keys

4.Select Wake up and program the new Wake up message using the normal text editing keys. To help with the message alignment, the phone's display will constantly be updated during this process

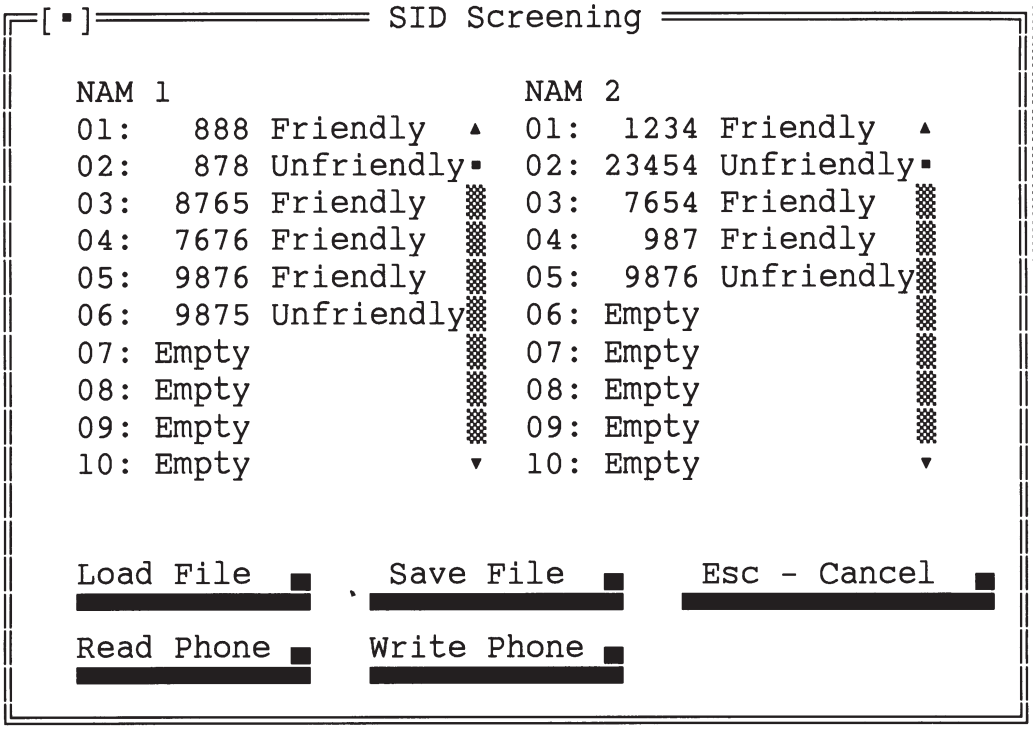
5.Select Security and program the new security code using the normal text editing keys

6.Select Enter to save to EEPROM.

Alternatively, the user is able to program each individual parameter if they choose not to use the customisation feature.

SID Programming

Selecting Dealer / SID Programming allows the user to set up System Area ID's as either Friendly or Unfriendly. When Roaming the phone is then able to select the system which is most desirable for the phone to operate on. Each NAM can have up to 31 SID's programmed into it's memory. An example of the SID Programming sub–menu is shown below.



Place the cursor over the desired SID location and press Enter or click on the cursor with the mouse. Select either Friendly or Unfriendly. Change to the number editing box field with the TAB key or clicking with a mouse. Now enter the numerical value of the SID.When this is complete you are able to accept the new values and return to the full SID dialogue box by pressing ENTER or by clicking the corresponding button. ESC will cancel the operation.

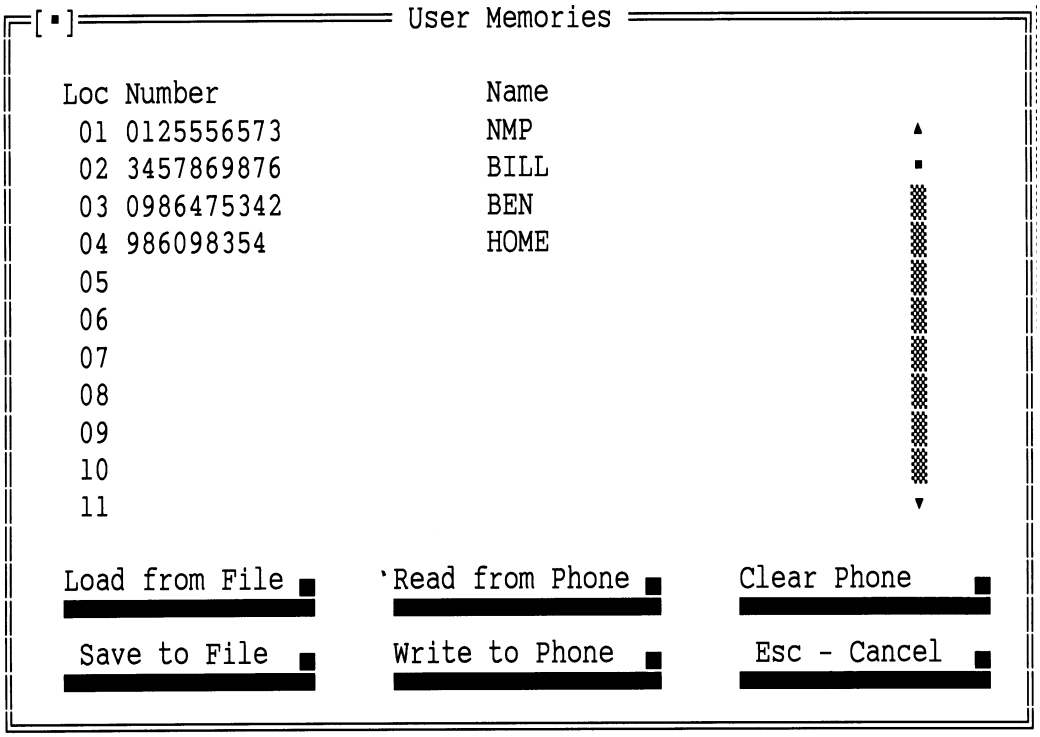
You are able to perform the following actions by selecting the corresponding button:

- File Load (Alt + L) – reads SID data from a file. You can select a file to be loaded from the File selection dialogue box.
- File Save (Alt + S) – writes SID data to a file. You can select the file to write to from the File selection dialogue box.
- Read Phone (Alt + R) – reads SID data from the phone and updates it to the display.
- Write Phone (Alt + W) – writes SID data to the phone. Before the data is written to the phone the user is asked to confirm the new data.
- Esc–Close – closes the SID programming dialogue box. Click the button or press the ESC key.

Short Code Memory

Selecting Dealer / Short Code Memory opens the short code memory dialogue box. In this box you can view and edit all 99 memory locations of the phone. You can also store the information to a file and read information from a file. It is possible to transfer the SCM Location data from one THA–4 Series Phone to a THA–4S Series Phone and vice versa but the usage of the SCM Locations differs between the two series of phones. In the THA–4 Series SCM Locations 1–99 are used to store numbers. In the THA–4S Series only SCM Locations 1–69 and 90–98 are used to store numbers whilst SCM Locations 70–89 are used for Digital Message Service usage. When attempting to carry out transfer of data between THA–4 and THA–4S Series phones a series of information dialog boxes will be displayed giving information about the impending transfer.

The SCM editing dialogue box is shown below:



Place the cursor over the desired SCM location and press Enter or click on the cursor with the mouse. In the editing dialogue box, edit or type in a new name and number. You can change the field with the TAB key or clicking with a mouse. When this is complete you are able to accept the new values and return to the full SCM dialogue box by pressing ENTER or by clicking the corresponding button. ESC will cancel the operation.

You are able to perform the following actions by selecting the corresponding button:

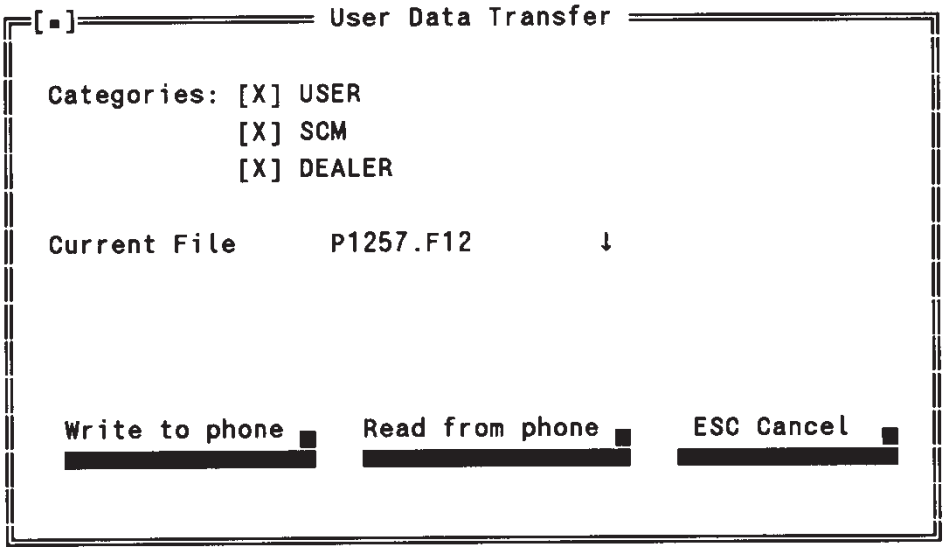
- File Load (Alt + L) – reads SCM data from a file. You can select a file to be loaded from the File selection dialogue box.
- File Save (Alt + S) – writes SCM data to a file. You can select the file to write to from the File selection dialogue box.
- Read Phone (Alt + R) – reads SCM data from the phone and updates it to the display.
- Write Phone (Alt + W) – writes SCM data to the phone. Before the data is written to the phone the user is asked to confirm the new data.
- Esc–Close – closes the SCM programming dialogue box. Click the button or press the ESC key.

User Data Transfer

Selecting Dealer / User Data Transfer allows all the User data (excluding the ESN) to be transferred from one phone and programmed into another phone. Also in this dialogue box you are able to reset all the following parameters to the factory default values:

- Subscriber (NAM) numbers
- Short Code Memory
- SID Screening Table
- User Menu Settings

An example of the user data transfer dialogue box is shown below.



Select with check boxes which information you wish to transfer or reset to factory values.

In the dialogue box the following buttons are available:

- File Load (Alt + L) – reads user data from a file. You can select a file to be loaded from the File selection dialogue box. Only items that were checked can be read back.
- File Save (Alt + S) – writes user data to a file. You can select the file to write to from the File selection dialogue box. Only items that were checked can be stored to the file.
- Read Phone (Alt + R) – reads user data items that are checked from the phone.
- Write Phone (Alt + W) – writes user data to the phone. Before writing the user is asked to confirm the writing.
- Reset (Alt + T) – Resets the checked items to the original factory values.
- Esc–Close – closes the user transfer dialogue box. Click the button or press the ESC key.

Warranty Information

THIS MENU IS AVAILABLE ONLY WITH THA–4S SERIES PHONES.
Selecting Dealer / Warranty Information allows user to view the status of the Warranty Information TESLA allows the facility to transfer User Data and Warranty Information between phones to support an Over The Counter Exchange Program. Data from a THA–4 Series phone can be programmed to a THA–4S Series phone but not vice versa.

- Original ESN – This is the ESN of the phone connected.
- Warranty ESN – If this phone has had data transferred from another phone then a copy of the ESN of that other phone is stored to this location in EEPROM. It is never transmitted.
- Manufacturing Month – Stored here is the month that the phone was manufactured.
- Repair Month – If a phone is returned for repair then the repair month can be stored here.
- Purchase Month – The month the phone was purchased in can be entered here.
- Read Phone (Alt + R) – reads Warranty Information from the phone.
- Write Phone (Alt + W) – writes Warranty Information to the phone. Before writing the user is asked to confirm the writing.
- Reset (Alt + T) – Resets the checked items to the original factory values. This is important as if a phone is returned for repair which has had its data transferred to another phone it will be returned as a defective phone.
- Esc–Close – closes the user transfer dialogue box. Click the button or press the ESC key.

Help Menu

The Help menu gives you access to the online help facility in a special window.

General Help

Choose Help/General Help to obtain general help information about the service TESLA.

Using Help

Choose Help/Using Help to obtain information on how to use the help facilities.

Product Information

Choose Help / Product Information to display information about the Version Number and copyright of the TESLA Service Software.

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